

$\chi_{c0}(1P)$

$$I^G(J^{PC}) = 0^+(0^{++})$$

$\chi_{c0}(1P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
3414.71 ± 0.30 OUR AVERAGE				
3413.0 ± 1.9 ± 0.6	933	¹ AAIJ	17BB LHCb	$pp \rightarrow b\bar{b}X \rightarrow 2(K^+K^-)X$
3414.2 ± 0.5 ± 2.3	5.4k	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow \text{hadrons}$
3406 ± 7 ± 6	230	² ABE	07 BELL	$e^+e^- \rightarrow J/\psi(c\bar{c})$
3414.21 ± 0.39 ± 0.27		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
3414.7 + 0.7 - 0.6 ± 0.2		³ ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
3415.5 ± 0.4 ± 0.4	392	⁴ BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
3417.4 + 1.8 - 1.9 ± 0.2		³ AMBROGIANI	99B E835	$\bar{p}p \rightarrow e^+e^-\gamma$
3414.1 ± 0.6 ± 0.8		BAI	99B BES	$\psi(2S) \rightarrow \gamma X$
3417.8 ± 0.4 ± 4		³ GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X$
3416 ± 3 ± 4		⁵ TANENBAUM	78 MRK1	e^+e^-
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
3414.6 ± 1.1	266	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$
3416.5 ± 3.0		EISENSTEIN	01 CLE2	$e^+e^- \rightarrow e^+e^-\chi_{c0}$
3422 ± 10		⁵ BARTEL	78B CNTR	$e^+e^- \rightarrow J/\psi 2\gamma$
3415 ± 9		⁵ BIDDICK	77 CNTR	$e^+e^- \rightarrow \gamma X$

¹ From a fit of the $\phi\phi$ invariant mass with the width of $\chi_{c0}(1P)$ fixed to the PDG 16 value.

² From a fit of the J/ψ recoil mass spectrum. Supersedes ABE,K 02 and ABE 04G.

³ Using mass of $\psi(2S) = 3686.0$ MeV.

⁴ Recalculated by ANDREOTTI 05A, using the value of $\psi(2S)$ mass from AULCHENKO 03.

⁵ Mass value shifted by us by amount appropriate for $\psi(2S)$ mass = 3686 MeV and $J/\psi(1S)$ mass = 3097 MeV.

$\chi_{c0}(1P)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
10.8 ± 0.6 OUR FIT				
10.5 ± 0.8 OUR AVERAGE Error includes scale factor of 1.1.				
10.6 ± 1.9 ± 2.6	5.4k	UEHARA	08 BELL	$\gamma\gamma \rightarrow \chi_{c0} \rightarrow \text{hadrons}$
12.6 + 1.5 + 0.9 - 1.6 - 1.1		ABLIKIM	05G BES2	$\psi(2S) \rightarrow \gamma\chi_{c0}$
8.6 + 1.7 - 1.3 ± 0.1		ANDREOTTI	03 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow \pi^0\pi^0$
9.7 ± 1.0	392	¹ BAGNASCO	02 E835	$\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi\gamma$
16.6 + 5.2 - 3.7 ± 0.1		AMBROGIANI	99B E835	$\bar{p}p \rightarrow e^+e^-\gamma$
14.3 ± 2.0 ± 3.0		BAI	98I BES	$\psi(2S) \rightarrow \gamma\pi^+\pi^-$
13.5 ± 3.3 ± 4.2		GAISER	86 CBAL	$\psi(2S) \rightarrow \gamma X, \gamma\pi^0\pi^0$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
13.2 ± 2.1	266	UEHARA	13 BELL	$\gamma\gamma \rightarrow K_S^0 K_S^0$

¹ Recalculated by ANDREOTTI 05A. **$\chi_{c0}(1P)$ DECAY MODES**

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Hadronic decays		
Γ_1 $2(\pi^+\pi^-)$	$(2.34 \pm 0.18) \%$	
Γ_2 $\rho^0\pi^+\pi^-$	$(9.1 \pm 2.9) \times 10^{-3}$	
Γ_3 $\rho^0\rho^0$		
Γ_4 $f_0(980)f_0(980)$	$(6.6 \pm 2.1) \times 10^{-4}$	
Γ_5 $\pi^+\pi^-\pi^0\pi^0$	$(3.3 \pm 0.4) \%$	
Γ_6 $\rho^+\pi^-\pi^0 + \text{c.c.}$	$(2.9 \pm 0.4) \%$	
Γ_7 $4\pi^0$	$(3.3 \pm 0.4) \times 10^{-3}$	
Γ_8 $\pi^+\pi^-K^+K^-$	$(1.81 \pm 0.14) \%$	
Γ_9 $K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow$ $\pi^+\pi^-K^+K^-$	$(9.8 \begin{smallmatrix} +4.0 \\ -2.8 \end{smallmatrix}) \times 10^{-4}$	
Γ_{10} $K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$(8.0 \begin{smallmatrix} +2.0 \\ -2.4 \end{smallmatrix}) \times 10^{-4}$	
Γ_{11} $K_1(1270)^+K^- + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$(6.3 \pm 1.9) \times 10^{-3}$	
Γ_{12} $K_1(1400)^+K^- + \text{c.c.} \rightarrow$ $\pi^+\pi^-K^+K^-$	$< 2.7 \times 10^{-3}$	CL=90%
Γ_{13} $f_0(980)f_0(980)$	$(1.6 \begin{smallmatrix} +1.0 \\ -0.9 \end{smallmatrix}) \times 10^{-4}$	
Γ_{14} $f_0(980)f_0(2200)$	$(7.9 \begin{smallmatrix} +2.0 \\ -2.5 \end{smallmatrix}) \times 10^{-4}$	
Γ_{15} $f_0(1370)f_0(1370)$	$< 2.7 \times 10^{-4}$	CL=90%
Γ_{16} $f_0(1370)f_0(1500)$	$< 1.7 \times 10^{-4}$	CL=90%
Γ_{17} $f_0(1370)f_0(1710)$	$(6.7 \begin{smallmatrix} +3.5 \\ -2.3 \end{smallmatrix}) \times 10^{-4}$	
Γ_{18} $f_0(1500)f_0(1370)$	$< 1.3 \times 10^{-4}$	CL=90%
Γ_{19} $f_0(1500)f_0(1500)$	$< 5 \times 10^{-5}$	CL=90%
Γ_{20} $f_0(1500)f_0(1710)$	$< 7 \times 10^{-5}$	CL=90%
Γ_{21} $K^+K^-\pi^+\pi^-\pi^0$	$(8.6 \pm 0.9) \times 10^{-3}$	
Γ_{22} $K_S^0K^\pm\pi^\mp\pi^+\pi^-$	$(4.2 \pm 0.4) \times 10^{-3}$	
Γ_{23} $K^+K^-\pi^0\pi^0$	$(5.6 \pm 0.9) \times 10^{-3}$	
Γ_{24} $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(2.49 \pm 0.33) \%$	
Γ_{25} $\rho^+K^-K^0 + \text{c.c.}$	$(1.21 \pm 0.21) \%$	
Γ_{26} $K^*(892)^-K^+\pi^0 \rightarrow$ $K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.}$	$(4.6 \pm 1.2) \times 10^{-3}$	
Γ_{27} $K_S^0K_S^0\pi^+\pi^-$	$(5.7 \pm 1.1) \times 10^{-3}$	
Γ_{28} $K^+K^-\eta\pi^0$	$(3.0 \pm 0.7) \times 10^{-3}$	
Γ_{29} $3(\pi^+\pi^-)$	$(1.20 \pm 0.18) \%$	
Γ_{30} $K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}$	$(7.5 \pm 1.6) \times 10^{-3}$	

Γ_{31}	$K^*(892)^0 \bar{K}^*(892)^0$	$(1.7 \pm 0.6) \times 10^{-3}$	
Γ_{32}	$\pi\pi$	$(8.51 \pm 0.33) \times 10^{-3}$	
Γ_{33}	$\pi^0\eta$	$< 1.8 \times 10^{-4}$	
Γ_{34}	$\pi^0\eta'$	$< 1.1 \times 10^{-3}$	
Γ_{35}	$\pi^0\eta_c$	$< 1.6 \times 10^{-3}$	CL=90%
Γ_{36}	$\eta\eta$	$(3.01 \pm 0.19) \times 10^{-3}$	
Γ_{37}	$\eta\eta'$	$(9.1 \pm 1.1) \times 10^{-5}$	
Γ_{38}	$\eta'\eta'$	$(2.17 \pm 0.12) \times 10^{-3}$	
Γ_{39}	$\omega\omega$	$(9.7 \pm 1.1) \times 10^{-4}$	
Γ_{40}	$\omega\phi$	$(1.41 \pm 0.13) \times 10^{-4}$	
Γ_{41}	$\omega K^+ K^-$	$(1.94 \pm 0.21) \times 10^{-3}$	
Γ_{42}	$K^+ K^-$	$(6.05 \pm 0.31) \times 10^{-3}$	
Γ_{43}	$K_S^0 K_S^0$	$(3.16 \pm 0.17) \times 10^{-3}$	
Γ_{44}	$\pi^+ \pi^- \eta$	$< 2.0 \times 10^{-4}$	CL=90%
Γ_{45}	$\pi^+ \pi^- \eta'$	$< 4 \times 10^{-4}$	CL=90%
Γ_{46}	$\bar{K}^0 K^+ \pi^- + \text{c.c.}$	$< 9 \times 10^{-5}$	CL=90%
Γ_{47}	$K^+ K^- \pi^0$	$< 6 \times 10^{-5}$	CL=90%
Γ_{48}	$K^+ K^- \eta$	$< 2.3 \times 10^{-4}$	CL=90%
Γ_{49}	$K^+ K^- K_S^0 K_S^0$	$(1.4 \pm 0.5) \times 10^{-3}$	
Γ_{50}	$K^+ K^- K^+ K^-$	$(2.82 \pm 0.29) \times 10^{-3}$	
Γ_{51}	$K^+ K^- \phi$	$(9.7 \pm 2.5) \times 10^{-4}$	
Γ_{52}	$\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}$	$(3.7 \pm 0.6) \times 10^{-3}$	
Γ_{53}	$K^+ K^- \pi^0 \phi$	$(1.90 \pm 0.35) \times 10^{-3}$	
Γ_{54}	$\phi \pi^+ \pi^- \pi^0$	$(1.18 \pm 0.15) \times 10^{-3}$	
Γ_{55}	$\phi\phi$	$(8.0 \pm 0.7) \times 10^{-4}$	
Γ_{56}	$\rho\bar{\rho}$	$(2.21 \pm 0.08) \times 10^{-4}$	
Γ_{57}	$\rho\bar{\rho}\pi^0$	$(7.0 \pm 0.7) \times 10^{-4}$	S=1.3
Γ_{58}	$\rho\bar{\rho}\eta$	$(3.5 \pm 0.4) \times 10^{-4}$	
Γ_{59}	$\rho\bar{\rho}\omega$	$(5.2 \pm 0.6) \times 10^{-4}$	
Γ_{60}	$\rho\bar{\rho}\phi$	$(6.0 \pm 1.4) \times 10^{-5}$	
Γ_{61}	$\rho\bar{\rho}\pi^+\pi^-$	$(2.1 \pm 0.7) \times 10^{-3}$	S=1.4
Γ_{62}	$\rho\bar{\rho}\pi^0\pi^0$	$(1.04 \pm 0.28) \times 10^{-3}$	
Γ_{63}	$\rho\bar{\rho}K^+K^-$ (non-resonant)	$(1.22 \pm 0.26) \times 10^{-4}$	
Γ_{64}	$\rho\bar{\rho}K_S^0 K_S^0$	$< 8.8 \times 10^{-4}$	CL=90%
Γ_{65}	$\rho\bar{n}\pi^-$	$(1.27 \pm 0.11) \times 10^{-3}$	
Γ_{66}	$\bar{\rho}n\pi^+$	$(1.37 \pm 0.12) \times 10^{-3}$	
Γ_{67}	$\rho\bar{n}\pi^-\pi^0$	$(2.34 \pm 0.21) \times 10^{-3}$	
Γ_{68}	$\bar{\rho}n\pi^+\pi^0$	$(2.21 \pm 0.18) \times 10^{-3}$	
Γ_{69}	$\Lambda\bar{\Lambda}$	$(3.27 \pm 0.24) \times 10^{-4}$	
Γ_{70}	$\Lambda\bar{\Lambda}\pi^+\pi^-$	$(1.18 \pm 0.13) \times 10^{-3}$	
Γ_{71}	$\Lambda\bar{\Lambda}\pi^+\pi^-$ (non-resonant)	$< 5 \times 10^{-4}$	CL=90%
Γ_{72}	$\Sigma(1385)^+ \bar{\Lambda}\pi^- + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%
Γ_{73}	$\Sigma(1385)^- \bar{\Lambda}\pi^+ + \text{c.c.}$	$< 5 \times 10^{-4}$	CL=90%
Γ_{74}	$K^+ \bar{p}\Lambda + \text{c.c.}$	$(1.25 \pm 0.12) \times 10^{-3}$	S=1.3

Γ_{75}	$K^+ \bar{p} \Lambda(1520) + \text{c.c.}$	$(2.9 \pm 0.7) \times 10^{-4}$	
Γ_{76}	$\Lambda(1520) \bar{\Lambda}(1520)$	$(3.1 \pm 1.2) \times 10^{-4}$	
Γ_{77}	$\Sigma^0 \bar{\Sigma}^0$	$(4.68 \pm 0.32) \times 10^{-4}$	
Γ_{78}	$\Sigma^+ \bar{\Sigma}^-$	$(4.6 \pm 0.8) \times 10^{-4}$	S=2.6
Γ_{79}	$\Sigma(1385)^+ \bar{\Sigma}(1385)^-$	$(1.6 \pm 0.6) \times 10^{-4}$	
Γ_{80}	$\Sigma(1385)^- \bar{\Sigma}(1385)^+$	$(2.3 \pm 0.7) \times 10^{-4}$	
Γ_{81}	$K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$	$(1.94 \pm 0.35) \times 10^{-4}$	
Γ_{82}	$\Xi^0 \bar{\Xi}^0$	$(3.1 \pm 0.8) \times 10^{-4}$	
Γ_{83}	$\Xi^- \bar{\Xi}^+$	$(4.8 \pm 0.7) \times 10^{-4}$	
Γ_{84}	$\eta_c \pi^+ \pi^-$	$< 7 \times 10^{-4}$	CL=90%

Radiative decays

Γ_{85}	$\gamma J/\psi(1S)$	$(1.40 \pm 0.05) \%$	
Γ_{86}	$\gamma \rho^0$	$< 9 \times 10^{-6}$	CL=90%
Γ_{87}	$\gamma \omega$	$< 8 \times 10^{-6}$	CL=90%
Γ_{88}	$\gamma \phi$	$< 6 \times 10^{-6}$	CL=90%
Γ_{89}	$\gamma \gamma$	$(2.04 \pm 0.09) \times 10^{-4}$	
Γ_{90}	$e^+ e^- J/\psi(1S)$	$(1.54 \pm 0.33) \times 10^{-4}$	

CONSTRAINED FIT INFORMATION

A multiparticle fit to $\chi_{c1}(1P)$, $\chi_{c0}(1P)$, $\chi_{c2}(1P)$, and $\psi(2S)$ with 4 total widths, a partial width, 25 combinations of partial widths obtained from integrated cross section, and 84 branching ratios uses 248 measurements to determine 49 parameters. The overall fit has a $\chi^2 = 378.1$ for 199 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta p_i \delta p_j \rangle / (\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i , including the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$.

x_2	24										
x_8	9	2									
x_{30}	5	1	28								
x_{32}	8	2	10	3							
x_{36}	4	1	5	1	14						
x_{42}	8	2	8	3	18	11					
x_{43}	7	2	8	2	18	10	14				
x_{50}	5	1	5	2	9	5	7	7			
x_{55}	7	2	6	2	9	5	7	7	4		
x_{56}	3	1	4	1	3	-1	7	7	3	3	
x_{69}	4	1	5	1	13	8	10	10	5	5	
x_{85}	5	1	6	2	17	11	13	12	6	6	
x_{89}	-8	-2	-2	-3	14	9	10	10	3	1	
Γ	-26	-6	-19	-10	-15	-7	-14	-12	-10	-13	
	x_1	x_2	x_8	x_{30}	x_{32}	x_{36}	x_{42}	x_{43}	x_{50}	x_{55}	

x_{69}	5										
x_{85}	-19	9									
x_{89}	6	9	13								
Γ	-4	-7	-9	-38							
	x_{56}	x_{69}	x_{85}	x_{89}							

$\chi_{c0}(1P)$ PARTIAL WIDTHS

$$\text{--- } \chi_{c0}(1P) \Gamma(i) \Gamma(\gamma J/\psi(1S)) / \Gamma(\text{total}) \text{ ---}$$

$$\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)) / \Gamma_{\text{total}} \qquad \Gamma_{56} \Gamma_{85} / \Gamma$$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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33.6 ± 2.3 OUR FIT

• • • We do not use the following data for averages, fits, limits, etc. • • •

26.6 ± 2.6 ± 1.4	392	1,2 BAGNASCO	02	E835 $\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi \gamma$
48.7 $^{+11.3}_{-8.9}$ ± 2.4		1,2 AMBROGIANI	99B	E835 $\bar{p}p \rightarrow \gamma J/\psi$

¹ Calculated by us using $B(J/\psi(1S) \rightarrow e^+e^-) = 0.0593 \pm 0.0010$.

² Values in $(\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S)))/\Gamma_{\text{total}}$ and $(\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S)))/\Gamma_{\text{total}}$ are not independent. The latter is used in the fit since it is less correlated to the total width.

———— $\chi_{c0}(1P) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$ ————

$\Gamma(2(\pi^+\pi^-)) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
52 ± 4					OUR FIT
49 ± 10					OUR AVERAGE Error includes scale factor of 1.8.
44.7 ± 3.6 ± 4.9		3.6k	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(\pi^+\pi^-)$
75 ± 13 ± 8			EISENSTEIN	01	CLE2 $e^+e^- \rightarrow e^+e^-\chi_{c0}$

$\Gamma(\rho^0\rho^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_3\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<12	90	<252	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow 2(\pi^+\pi^-)$

$\Gamma(\pi^+\pi^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_8\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
40.0 ± 3.5					OUR FIT
38.8 ± 3.7 ± 4.7		1.7k	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+K^-\pi^+\pi^-$

$\Gamma(K^+K^-\pi^+\pi^-\pi^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{21}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
26 ± 4 ± 4		1094	DEL-AMO-SA..11M	BABR	$\gamma\gamma \rightarrow K^+K^-\pi^+\pi^-\pi^0$

$\Gamma(K^+\bar{K}^*(892)^0\pi^- + \text{c.c.}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{30}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
16 ± 4					OUR FIT
16.7 ± 6.1 ± 3.0		495 ± 182	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+K^-\pi^+\pi^-$

$\Gamma(K^*(892)^0\bar{K}^*(892)^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{31}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6	90	<148	UEHARA	08	BELL $\gamma\gamma \rightarrow \chi_{c0} \rightarrow K^+K^-\pi^+\pi^-$

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{32}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
18.8 ± 1.3					OUR FIT
23 ± 5					OUR AVERAGE
29.7 ^{+17.4} _{-12.0} ± 4.8		103 ⁺⁶⁰ ₋₄₂	¹ UEHARA	09	BELL 10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
22.7 ± 3.2 ± 3.5		129 ± 18	² NAKAZAWA	05	BELL 10.6 $e^+e^- \rightarrow e^+e^-\pi^+\pi^-$

¹ We multiplied the measurement by 3 to convert from $\pi^0\pi^0$ to $\pi\pi$. Interference with the continuum included.

² We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

$\Gamma(\eta\eta) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{36}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
9.4±2.3±1.2	22	¹ UEHARA	10A BELL	10.6 e ⁺ e ⁻ → e ⁺ e ⁻ ηη

¹Interference with the continuum not included.

$\Gamma(\omega\omega) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{39}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<3.9	90	¹ LIU	12B BELL	γγ → 2(π ⁺ π ⁻ π ⁰)

¹Using B(ω → π⁺π⁻π⁰) = (89.2 ± 0.7)%.

$\Gamma(\omega\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{40}\Gamma_{89}/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.34	90	¹ LIU	12B BELL	γγ → K ⁺ K ⁻ π ⁺ π ⁻ π ⁰

¹Using B(φ → K⁺K⁻) = (48.9 ± 0.5)% and B(ω → π⁺π⁻π⁰) = (89.2 ± 0.7)%.

$\Gamma(K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{42}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
13.4±1.0 OUR FIT				
14.3±1.6±2.3	153 ± 17	NAKAZAWA	05 BELL	10.6 e ⁺ e ⁻ → e ⁺ e ⁻ K ⁺ K ⁻

$\Gamma(K_S^0 K_S^0) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{43}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
7.0 ± 0.5 OUR FIT				
8.7 ± 1.7 ± 0.9	266	¹ UEHARA	13 BELL	γγ → K _S ⁰ K _S ⁰

• • • We do not use the following data for averages, fits, limits, etc. • • •

7.00±0.65±0.71	134 ± 12	CHEN	07B BELL	e ⁺ e ⁻ → e ⁺ e ⁻ χ _{c0}
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¹Supersedes CHEN 07B.

$\Gamma(K^+K^-K^+K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{50}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
6.2±0.7 OUR FIT				
7.9±1.3±1.1	215 ± 36	UEHARA	08 BELL	γγ → χ _{c0} → 2(K ⁺ K ⁻)

$\Gamma(\phi\phi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_{55}\Gamma_{89}/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
1.76±0.18 OUR FIT				
1.72±0.33±0.14	56 ± 11	¹ LIU	12B BELL	γγ → 2(K ⁺ K ⁻)

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.3 ± 0.9 ± 0.4	23.6 ± 9.6	UEHARA	08 BELL	γγ → χ _{c0} → 2(K ⁺ K ⁻)
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¹Supersedes UEHARA 08. Using B(φ → K⁺K⁻) = (48.9 ± 0.5)%.

$\chi_{c0}(1P)$ BRANCHING RATIOS

HADRONIC DECAYS

$$\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}} \quad \Gamma_1/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>
0.0234±0.0018 OUR FIT	

$$\Gamma(\rho^0\pi^+\pi^-)/\Gamma(2(\pi^+\pi^-)) \quad \Gamma_2/\Gamma_1$$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.39±0.12 OUR FIT			
0.39±0.12	TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c0}$

$$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}} \quad \Gamma_2/\Gamma$$

<u>VALUE</u>	<u>DOCUMENT ID</u>
0.0091±0.0029 OUR FIT	

$$\Gamma(f_0(980)f_0(980))/\Gamma_{\text{total}} \quad \Gamma_4/\Gamma$$

<u>VALUE (units 10⁻⁴)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
6.6±2.1±0.1	36 ± 9	¹ ABLIKIM	04G BES	$\psi(2S) \rightarrow \gamma 2\pi^+ 2\pi^-$

¹ ABLIKIM 04G reports $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980)f_0(980))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (6.5 \pm 1.6 \pm 1.3) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}} \quad \Gamma_5/\Gamma$$

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.3±0.4±0.1	1751.4	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $3.54 \pm 0.10 \pm 0.43 \pm 0.18$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+\pi^-\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$$\Gamma(\rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}} \quad \Gamma_6/\Gamma$$

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2.9±0.4±0.1	1358.5	^{1,2} HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $3.04 \pm 0.18 \pm 0.42 \pm 0.16$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho^+\pi^-\pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Calculated by us. We have added the values from HE 08B for $\rho^+\pi^-\pi^0$ and $\rho^-\pi^+\pi^0$ decays assuming uncorrelated statistical and fully correlated systematic uncertainties.

$\Gamma(4\pi^0)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$3.3 \pm 0.4 \pm 0.1$	3296	¹ ABLIKIM	11A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ ABLIKIM 11A reports $(3.34 \pm 0.06 \pm 0.44) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow 4\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (units 10^{-3})	DOCUMENT ID
18.1 ± 1.4 OUR FIT	

$\Gamma(K^+\bar{K}^*(892)^0\pi^- + \text{c.c.})/\Gamma(\pi^+\pi^-K^+K^-)$ Γ_{30}/Γ_8

VALUE	DOCUMENT ID	TECN	COMMENT
0.41 ± 0.09 OUR FIT			
0.41 ± 0.10	TANENBAUM 78	MRK1	$\psi(2S) \rightarrow \gamma\chi_{c0}$

$\Gamma(K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$9.8^{+3.6}_{-2.8} \pm 0.2$	83	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $(10.44 \pm 2.37^{+3.05}_{-1.90}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_0^*(1430)^0\bar{K}_0^*(1430)^0 \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$8.0^{+2.0}_{-2.4} \pm 0.2$	62	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $(8.49 \pm 1.66^{+1.32}_{-1.99}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_0^*(1430)^0\bar{K}_2^*(1430)^0 + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_1(1270)^+K^- + \text{c.c.} \rightarrow \pi^+\pi^-K^+K^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$6.3 \pm 1.9 \pm 0.1$	68	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $(6.66 \pm 1.31 \pm_{-1.51}^{+1.60}) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_1(1270)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The measurement assumes $B(K_1(1270) \rightarrow K \rho(770)) = 42 \pm 6\%$.

$\Gamma(K_1(1400)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}$ Γ_{12} / Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<2.7	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
¹ ABLIKIM 05Q reports $< 2.85 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K_1(1400)^+ K^- + \text{c.c.} \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$. The measurement assumes $B(K_1(1400) \rightarrow K^*(892)\pi) = 94 \pm 6\%$.				

$\Gamma(f_0(980) f_0(980)) / \Gamma_{\text{total}}$ Γ_{13} / Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$16.2 \pm_{-9.0}^{+10.4} \pm 0.3$	28	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
¹ ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980) f_0(980)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (1.59 \pm 0.50 \pm_{-0.72}^{+0.89}) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. One of the $f_0(980)$ mesons is identified via decay to $\pi^+ \pi^-$ while the other via $K^+ K^-$ decay.				

$\Gamma(f_0(980) f_0(2200)) / \Gamma_{\text{total}}$ Γ_{14} / Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$7.9 \pm_{-2.5}^{+2.0} \pm 0.2$	77	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
¹ ABLIKIM 05Q reports $(8.42 \pm 1.42 \pm_{-2.29}^{+1.65}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(980) f_0(2200)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The f_0 mesons are identified via $f_0(980) \rightarrow \pi^+ \pi^-$ and $f_0(2200) \rightarrow K^+ K^-$ decays.				

$\Gamma(f_0(1370) f_0(1370)) / \Gamma_{\text{total}}$ Γ_{15} / Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<2.7	90	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$
¹ ABLIKIM 05Q reports $< 2.9 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370) f_0(1370)) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$. One of the $f_0(1370)$ mesons is identified via decay to $\pi^+ \pi^-$ while the other via $K^+ K^-$ decay. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

$\Gamma(f_0(1370)f_0(1500))/\Gamma_{\text{total}}$ **Γ_{16}/Γ**

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<1.7	90	¹ ABLIKIM	05Q	BES2 $\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 1.8 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370)f_0(1500))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1370) \rightarrow \pi^+\pi^-$ and $f_0(1500) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

$\Gamma(f_0(1370)f_0(1710))/\Gamma_{\text{total}}$ **Γ_{17}/Γ**

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$6.7^{+3.5}_{-2.3} \pm 0.1$	61	¹ ABLIKIM	05Q	BES2 $\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $(7.12 \pm 1.85^{+3.28}_{-1.68}) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1370)f_0(1710))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. The f_0 mesons are identified via $f_0(1370) \rightarrow \pi^+\pi^-$ and $f_0(1710) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

$\Gamma(f_0(1500)f_0(1370))/\Gamma_{\text{total}}$ **Γ_{18}/Γ**

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<1.3	90	¹ ABLIKIM	05Q	BES2 $\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 1.4 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500)f_0(1370))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \rightarrow \pi^+\pi^-$ and $f_0(1370) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

$\Gamma(f_0(1500)f_0(1500))/\Gamma_{\text{total}}$ **Γ_{19}/Γ**

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.5	90	¹ ABLIKIM	05Q	BES2 $\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$
¹ ABLIKIM 05Q reports $< 0.55 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500)f_0(1500))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$. One of the $f_0(1500)$ is identified via decay to $\pi^+\pi^-$ while the other via K^+K^- decay. Both branching fractions for these f_0 decays are implicitly included in the quoted result.				

$\Gamma(f_0(1500)f_0(1710))/\Gamma_{\text{total}}$ **Γ_{20}/Γ**

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.7	90	¹ ABLIKIM	05Q	BES2 $\psi(2S) \rightarrow \gamma\pi^+\pi^-K^+K^-$

¹ ABLIKIM 05Q reports $< 0.73 \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow f_0(1500)f_0(1710))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$. The f_0 mesons are identified via $f_0(1500) \rightarrow \pi^+\pi^-$ and $f_0(1710) \rightarrow K^+K^-$ decays. Both branching fractions for these f_0 decays are implicitly included in the quoted result.

$\Gamma(K^+K^-\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ **Γ_{21}/Γ**

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$8.61 \pm 0.13 \pm 0.94$	9.0k	¹ ABLIKIM	13B BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(K_S^0 K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{\text{total}}$ **Γ_{22}/Γ**

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$4.22 \pm 0.10 \pm 0.43$	2.7k	¹ ABLIKIM	13B BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(K^+K^-\pi^0\pi^0)/\Gamma_{\text{total}}$ **Γ_{23}/Γ**

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$0.56 \pm 0.09 \pm 0.01$	213.5	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.59 \pm 0.05 \pm 0.08 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{24}/Γ**

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$2.49 \pm 0.33 \pm 0.05$	401.7	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $2.64 \pm 0.15 \pm 0.31 \pm 0.14$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\pi^-\bar{K}^0\pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho^+K^-K^0 + \text{c.c.})/\Gamma_{\text{total}}$ **Γ_{25}/Γ**

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
$1.21 \pm 0.21 \pm 0.02$	179.7	¹ HE	08B CLEO	$e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $1.28 \pm 0.16 \pm 0.15 \pm 0.07$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho^+K^-K^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^- K^+ \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.46±0.12±0.01	64.1	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.49 \pm 0.10 \pm 0.07 \pm 0.03$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^- K^+ \pi^0 \rightarrow K^+ \pi^- \bar{K}^0 \pi^0 + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K_S^0 K_S^0 \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
5.7±1.0±0.1	152 ± 14	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0 \pi^+ \pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ = $(0.558 \pm 0.051 \pm 0.089) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.30±0.07±0.01	56.4	¹ HE	08B CLEO	$e^+ e^- \rightarrow \gamma h^+ h^- h^0 h^0$

¹ HE 08B reports $0.32 \pm 0.05 \pm 0.05 \pm 0.02$ % from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \eta \pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(3(\pi^+ \pi^-))/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
12.0±1.8 OUR EVALUATION	Treating systematic error as correlated.		
12.0±1.7 OUR AVERAGE			

11.7±1.0±1.9

¹ BAI 99B BES $\psi(2S) \rightarrow \gamma \chi_{c0}$

12.5±2.9±0.5

¹ TANENBAUM 78 MRK1 $\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(K^+ \bar{K}^*(892)^0 \pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE	DOCUMENT ID
0.0075±0.0016 OUR FIT	

$\Gamma(K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{31}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.72^{+0.60}_{-0.54}±0.04	64	¹ ABLIKIM	05Q BES2	$\psi(2S) \rightarrow \gamma \pi^+ \pi^- K^+ K^-$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.56±0.40±0.03 30 ± 6 ^{2,3} ABLIKIM 04H BES Repl. by ABLIKIM 05Q

¹ ABLIKIM 05Q reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (0.168 \pm 0.035^{+0.047}_{-0.040}) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Assumes $B(K^*(892)^0 \rightarrow K^- \pi^+) = 2/3$.

³ ABLIKIM 04H reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^*(892)^0 \bar{K}^*(892)^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (1.53 \pm 0.29 \pm 0.26) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi\pi)/\Gamma_{\text{total}}$ **Γ_{32}/Γ**
VALUE (units 10^{-3}) DOCUMENT ID
8.51 ± 0.33 OUR FIT

$\Gamma(\pi^0 \eta_c)/\Gamma_{\text{total}}$ **Γ_{35}/Γ**
VALUE CL% DOCUMENT ID TECN COMMENT
 $< 1.6 \times 10^{-3}$ 90 ¹ ABLIKIM 15N BES3 $\psi(2S) e^+ e^- \rightarrow \gamma \pi^0 \eta_c$
¹ Using $B(\eta_c \rightarrow K_S^0 K^\pm \pi^\mp) \times B(K_S^0 \rightarrow \pi^+ \pi^-) \times B(\pi^0 \rightarrow \gamma \gamma) = (1.66 \pm 0.11) \times 10^{-2}$.

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ **Γ_{36}/Γ**
VALUE (units 10^{-3}) DOCUMENT ID
3.01 ± 0.19 OUR FIT

$\Gamma(\eta\eta)/\Gamma(\pi\pi)$ **Γ_{36}/Γ_{32}**
VALUE DOCUMENT ID TECN COMMENT
0.353 ± 0.025 OUR FIT

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.26 ± 0.09 $^{+0.03}_{-0.02}$ ¹ ANDREOTTI 05C E835 $\bar{p} p \rightarrow 2$ mesons
 0.24 ± 0.10 ± 0.08 ¹ BAI 03C BES $\psi(2S) \rightarrow 5\gamma$

¹ We have multiplied $\pi^0 \pi^0$ measurement by 3 to obtain $\pi\pi$.

$\Gamma(\eta\eta')/\Gamma_{\text{total}}$ **Γ_{37}/Γ**
VALUE (units 10^{-5}) CL% EVTS DOCUMENT ID TECN COMMENT
9.1 ± 1.1 ± 0.2 85 ¹ ABLIKIM 17AI BES3 $\psi(2S) \rightarrow \gamma \eta' \eta$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<24 90 35 ± 13 ² ASNER 09 CLEO $\psi(2S) \rightarrow \gamma \eta' \eta$
 <50 90 ³ ADAMS 07 CLEO $\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ABLIKIM 17AI reports $(8.92 \pm 0.84 \pm 0.65) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ASNER 09 reports $< 0.25 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

³ Superseded by ASNER 09. ADAMS 07 reports $< 0.5 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$					Γ_{38}/Γ
VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT	
2.17±0.12 OUR AVERAGE					
2.23±0.13±0.05	2.5k	¹ ABLIKIM	17A1 BES3	$\psi(2S) \rightarrow \gamma\eta'\eta'$	
2.00±0.21±0.04	0.4k	² ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\eta'\eta'$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
1.60±0.41±0.03	23	³ ADAMS	07 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$	

¹ ABLIKIM 17A1 reports $(2.19 \pm 0.03 \pm 0.14) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ASNER 09 reports $(2.12 \pm 0.13 \pm 0.21) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ Superseded by ASNER 09. ADAMS 07 reports $(1.7 \pm 0.4 \pm 0.2) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \eta'\eta')/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 0.0922 \pm 0.0011 \pm 0.0046$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\omega)/\Gamma_{\text{total}}$					Γ_{39}/Γ
VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT	
0.97±0.11 OUR AVERAGE					
0.93±0.11±0.02	991	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons	
2.16±0.66±0.04	38.1 ± 9.6	² ABLIKIM	05N BES2	$\psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma 6\pi$	

¹ ABLIKIM 11K reports $(0.95 \pm 0.03 \pm 0.11) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABLIKIM 05N reports $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(0.212 \pm 0.053 \pm 0.037) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\omega\phi)/\Gamma_{\text{total}}$					Γ_{40}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
1.41±0.13±0.03					
1.18±0.22±0.02	76	^{2,3} ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					

¹ ABLIKIM 19J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (13.83 \pm 0.70 \pm 1.01) \times 10^{-6}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABLIKIM 11K reports $(1.2 \pm 0.1 \pm 0.2) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \omega\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ Superseded by ABLIKIM 19J.

$\Gamma(\omega K^+ K^-)/\Gamma_{\text{total}}$

Γ_{41}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.94 ± 0.06 ± 0.20	1.4k	¹ ABLIKIM	13B BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$

¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(K^+ K^-)/\Gamma_{\text{total}}$

Γ_{42}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
6.05 ± 0.31 OUR FIT	

$\Gamma(K_S^0 K_S^0)/\Gamma_{\text{total}}$

Γ_{43}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
3.16 ± 0.17 OUR FIT	

$\Gamma(K_S^0 K_S^0)/\Gamma(\pi\pi)$

Γ_{43}/Γ_{32}

VALUE	DOCUMENT ID	TECN	COMMENT
0.371 ± 0.023 OUR FIT			

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.31 ± 0.05 ± 0.05 ^{1,2} CHEN 07B BELL $e^+e^- \rightarrow e^+e^-\chi_{c0}$

¹ Using $\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from the $\pi^+\pi^-$ measurement of NAKAZAWA 05 rescaled by 3/2 to convert to $\pi\pi$.

² Not independent from other measurements.

$\Gamma(K_S^0 K_S^0)/\Gamma(K^+ K^-)$

Γ_{43}/Γ_{42}

VALUE	DOCUMENT ID	TECN	COMMENT
0.52 ± 0.04 OUR FIT			

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.49 ± 0.07 ± 0.08 ^{1,2} CHEN 07B BELL $e^+e^- \rightarrow e^+e^-\chi_{c0}$

¹ Using $\Gamma(K^+ K^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ from NAKAZAWA 05.

² Not independent from other measurements.

$\Gamma(\pi^+ \pi^- \eta)/\Gamma_{\text{total}}$

Γ_{44}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.20	90	¹ ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<1.0 90 ² ABLIKIM 06R BES2 $\psi(2S) \rightarrow \gamma\chi_{c0}$

¹ ATHAR 07 reports $< 0.21 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

² ABLIKIM 06R reports $< 1.1 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\pi^+ \pi^- \eta') / \Gamma_{\text{total}}$ **Γ_{45} / Γ**

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.4	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.38 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- \eta') / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}$ **Γ_{46} / Γ**

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.09	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.7	90	^{2,3} ABLIKIM 06R	BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$
<0.7	90	^{3,4} BAI 99B	BES	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ATHAR 07 reports $< 0.10 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

² ABLIKIM 06R reports $< 0.70 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{K}^0 K^+ \pi^- + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

³ We have multiplied the $K_S^0 K^+ \pi^-$ measurement by a factor of 2 to convert to $K^0 K^+ \pi^-$.

⁴ Rescaled by us using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(K^+ K^- \pi^0) / \Gamma_{\text{total}}$ **Γ_{47} / Γ**

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.06	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.06 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \pi^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(K^+ K^- \eta) / \Gamma_{\text{total}}$ **Γ_{48} / Γ**

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.23	90	¹ ATHAR 07	CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ATHAR 07 reports $< 0.24 \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \eta) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(K^+ K^- K_S^0 \bar{K}_S^0) / \Gamma_{\text{total}}$ Γ_{49} / Γ

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.41 ± 0.47 ± 0.03	16.8 ± 4.8	¹ ABLIKIM	050 BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ ABLIKIM 050 reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K_S^0 \bar{K}_S^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (0.138 \pm 0.039 \pm 0.025) \times 10^{-3}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^+ K^- K^+ K^-) / \Gamma_{\text{total}}$ Γ_{50} / Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>
2.82 ± 0.29 OUR FIT	

$\Gamma(K^+ K^- \phi) / \Gamma_{\text{total}}$ Γ_{51} / Γ

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.97 ± 0.25 ± 0.02	38	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ ABLIKIM 06T reports $(1.03 \pm 0.22 \pm 0.15) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- \phi) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{K}^0 K^+ \pi^- \phi + \text{c.c.}) / \Gamma_{\text{total}}$ Γ_{52} / Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.68 ± 0.30 ± 0.50	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$\Gamma(K^+ K^- \pi^0 \phi) / \Gamma_{\text{total}}$ Γ_{53} / Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.90 ± 0.14 ± 0.32	ABLIKIM	15M BES3	$\psi(2S) \rightarrow \gamma \chi_{c0}$

$\Gamma(\phi \pi^+ \pi^- \pi^0) / \Gamma_{\text{total}}$ Γ_{54} / Γ

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.18 ± 0.07 ± 0.13	538	¹ ABLIKIM	13B BES3	$e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Using $1.06 \times 10^8 \psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

$\Gamma(\phi \phi) / \Gamma_{\text{total}}$ Γ_{55} / Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>
0.80 ± 0.07 OUR FIT	

$\Gamma(p \bar{p}) / \Gamma_{\text{total}}$ Γ_{56} / Γ

<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>
2.21 ± 0.08 OUR FIT	

$\Gamma(p\bar{p}\pi^0)/\Gamma_{\text{total}}$ Γ_{57}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.70±0.07 OUR AVERAGE	Error includes scale factor of 1.3.		
0.73±0.06±0.01	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
0.56±0.12±0.01	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(7.76 \pm 0.37 \pm 0.51 \pm 0.39) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $(0.59 \pm 0.10 \pm 0.08) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{58}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.35±0.04 OUR AVERAGE			
0.35±0.04±0.01	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$
0.37±0.11±0.01	² ATHAR	07 CLEO	$\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ONYISI 10 reports $(3.73 \pm 0.38 \pm 0.28 \pm 0.19) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ATHAR 07 reports $(0.39 \pm 0.11 \pm 0.04) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\eta)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p}\omega)/\Gamma_{\text{total}}$ Γ_{59}/Γ

<u>VALUE (units 10^{-3})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.52±0.06±0.01	¹ ONYISI	10 CLE3	$\psi(2S) \rightarrow \gamma p\bar{p}X$

¹ ONYISI 10 reports $(5.57 \pm 0.48 \pm 0.42 \pm 0.14) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(p\bar{p}\phi)/\Gamma_{\text{total}}$ Γ_{60}/Γ

<u>VALUE (units 10^{-5})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
6.0±1.4±0.1	42 ± 8	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p\bar{p}K^+ K^-$

¹ ABLIKIM 11F reports $(6.12 \pm 1.18 \pm 0.86) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p}\phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho\bar{\rho}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{61}/Γ

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
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2.1 ± 0.7 OUR EVALUATION Error includes scale factor of 1.4. Treating systematic error as correlated.

2.1 ± 1.0 OUR AVERAGE Error includes scale factor of 2.0.

1.57 ± 0.21 ± 0.53	¹ BAI	99B	BES $\psi(2S) \rightarrow \gamma\chi_{c0}$
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4.20 ± 1.15 ± 0.18	¹ TANENBAUM	78	MRK1 $\psi(2S) \rightarrow \gamma\chi_{c0}$
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¹ Rescaled by us using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.6 \pm 0.5)\%$.

$\Gamma(\rho\bar{\rho}\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_{62}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.104 ± 0.028 ± 0.002	39.5	¹ HE	08B	CLEO $e^+e^- \rightarrow \gamma h^+ h^- h^0 h^0$
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¹ HE 08B reports $0.11 \pm 0.02 \pm 0.02 \pm 0.01\%$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{\rho}\pi^0\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho\bar{\rho}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}$ Γ_{63}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.22 ± 0.26 ± 0.02	48 ± 8	¹ ABLIKIM	11F	BES3 $\psi(2S) \rightarrow \gamma\rho\bar{\rho}K^+K^-$
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¹ ABLIKIM 11F reports $(1.24 \pm 0.20 \pm 0.18) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{\rho}K^+K^- \text{ (non-resonant)})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\rho\bar{\rho}K_S^0K_S^0)/\Gamma_{\text{total}}$ Γ_{64}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
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<8.8	90	¹ ABLIKIM	06D	BES2 $\psi(2S) \rightarrow \chi_{c0}\gamma$
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¹ Using $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

$\Gamma(\rho\bar{\eta}\pi^-)/\Gamma_{\text{total}}$ Γ_{65}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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12.7 ± 1.1 OUR AVERAGE

12.9 ± 1.1 ± 0.3	5150	¹ ABLIKIM	12J	BES3 $\psi(2S) \rightarrow \gamma\rho\bar{\eta}\pi^-$
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11.2 ± 3.1 ± 0.2		² ABLIKIM	06i	BES2 $\psi(2S) \rightarrow \gamma\rho\pi^-X$
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¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{\eta}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(1.26 \pm 0.02 \pm 0.11) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² ABLIKIM 06i reports $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{\eta}\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ = $(1.10 \pm 0.24 \pm 0.18) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\bar{p}n\pi^+)/\Gamma_{\text{total}}$ Γ_{66}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
13.7±1.2±0.3	5808	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{p}n\pi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (1.34 \pm 0.03 \pm 0.11) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\rho\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{67}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
23.4±2.0±0.5	2480	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\rho\bar{n}\pi^-\pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \rho\bar{n}\pi^-\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (2.29 \pm 0.08 \pm 0.18) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}$ Γ_{68}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
22.1±1.8±0.5	2757	¹ ABLIKIM	12J BES3	$\psi(2S) \rightarrow \gamma\bar{p}n\pi^+\pi^0$

¹ ABLIKIM 12J reports $[\Gamma(\chi_{c0}(1P) \rightarrow \bar{p}n\pi^+\pi^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))] = (2.16 \pm 0.07 \pm 0.16) \times 10^{-4}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$ Γ_{69}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
3.27±0.24 OUR FIT	

 $\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{70}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
118±12±2		426	¹ ABLIKIM	12I BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<400 90 ² ABLIKIM 06D BES2 $\psi(2S) \rightarrow \chi_{c0}\gamma$

¹ ABLIKIM 12I reports $(119.0 \pm 6.4 \pm 11.4) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c0}\gamma) = (9.2 \pm 0.5)\%$

 $\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^- (\text{non-resonant}))/\Gamma_{\text{total}}$ Γ_{71}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<50	90	¹ ABLIKIM	12I BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}\pi^+\pi^-$

¹ ABLIKIM 12I reports $< 54 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda}\pi^+\pi^- (\text{non-resonant}))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{72}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<50	90	¹ ABLIKIM	12I	BES3 $\psi(2S) \rightarrow \gamma \Sigma(1385)^+\bar{\Lambda}\pi^-$

¹ ABLIKIM 12I reports $< 55 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^+\bar{\Lambda}\pi^- + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

 $\Gamma(\Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{73}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<50	90	¹ ABLIKIM	12I	BES3 $\psi(2S) \rightarrow \gamma \Sigma(1385)^-\bar{\Lambda}\pi^+$

¹ ABLIKIM 12I reports $< 50 \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^-\bar{\Lambda}\pi^+ + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

 $\Gamma(K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{74}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.25 ± 0.12 OUR AVERAGE				Error includes scale factor of 1.3.
$1.30 \pm 0.09 \pm 0.03$	9k	^{1,2} ABLIKIM	13D	BES3 $\psi(2S) \rightarrow \gamma \Lambda \bar{p} K^+$
$1.01 \pm 0.19 \pm 0.02$		³ ATHAR	07	CLEO $\psi(2S) \rightarrow \gamma h^+ h^- h^0$

¹ ABLIKIM 13D reports $(1.32 \pm 0.03 \pm 0.10) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\Lambda \rightarrow p\pi^-) = 63.9\%$.

³ ATHAR 07 reports $(1.07 \pm 0.17 \pm 0.12) \times 10^{-3}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(K^+\bar{p}\Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{75}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$2.9 \pm 0.7 \pm 0.1$	62 ± 12	¹ ABLIKIM	11F	BES3 $\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$

¹ ABLIKIM 11F reports $(3.00 \pm 0.58 \pm 0.50) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow K^+\bar{p}\Lambda(1520) + \text{c.c.})/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}$ Γ_{76}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.1±1.2±0.1	28 ± 10	¹ ABLIKIM	11F BES3	$\psi(2S) \rightarrow \gamma p \bar{p} K^+ K^-$

¹ ABLIKIM 11F reports $(3.18 \pm 1.11 \pm 0.53) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Lambda(1520)\bar{\Lambda}(1520))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

 $\Gamma(\Sigma^0\bar{\Sigma}^0)/\Gamma_{\text{total}}$ Γ_{77}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
4.68±0.32 OUR AVERAGE				

4.82±0.34±0.10	1046	¹ ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^0\bar{\Sigma}^0$
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4.2 ± 0.7 ± 0.1	78 ± 10	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^0\bar{\Sigma}^0$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

4.7 ± 0.5 ± 0.1	243	^{3,4} ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^0\bar{\Sigma}^0$
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¹ ABLIKIM 18V reports $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0\bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (4.72 \pm 0.18 \pm 0.28) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² NAIK 08 reports $(4.41 \pm 0.56 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0\bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ ABLIKIM 13H reports $(4.78 \pm 0.34 \pm 0.39) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^0\bar{\Sigma}^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

⁴ Superseded by ABLIKIM 18V

 $\Gamma(\Sigma^+\bar{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{78}/Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
4.6 ± 0.8 OUR AVERAGE				Error includes scale factor of 2.6.

5.10±0.35±0.10	747	¹ ABLIKIM	18V BES3	$\psi(2S) \rightarrow \gamma \Sigma^+\bar{\Sigma}^-$
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3.1 ± 0.7 ± 0.1	39 ± 7	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma \Sigma^+\bar{\Sigma}^-$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

4.5 ± 0.5 ± 0.1	148	^{3,4} ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma \Sigma^+\bar{\Sigma}^-$
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¹ ABLIKIM 18V reports $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+\bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))] = (4.99 \pm 0.24 \pm 0.24) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² NAIK 08 reports $(3.25 \pm 0.57 \pm 0.43) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+\bar{\Sigma}^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$.

= $(9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

³ ABLIKIM 13H reports $(4.54 \pm 0.42 \pm 0.30) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma^+ \bar{\Sigma}^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

⁴ Superseded by ABLIKIM 18V

$\Gamma(\Sigma(1385)^+ \bar{\Sigma}(1385)^-) / \Gamma_{\text{total}}$ Γ_{79} / Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
16.2±5.8±0.3	27	¹ ABLIKIM	12I	BES3 $\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

¹ ABLIKIM 12I reports $(16.4 \pm 5.7 \pm 1.6) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^+ \bar{\Sigma}(1385)^-) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Sigma(1385)^- \bar{\Sigma}(1385)^+) / \Gamma_{\text{total}}$ Γ_{80} / Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
23.2±6.5±0.5	33	¹ ABLIKIM	12I	BES3 $\psi(2S) \rightarrow \gamma \Lambda \bar{\Lambda} \pi^+ \pi^-$

¹ ABLIKIM 12I reports $(23.5 \pm 6.2 \pm 2.3) \times 10^{-5}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Sigma(1385)^- \bar{\Sigma}(1385)^+) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.68 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^- \Lambda \bar{\Xi}^+ + \text{c.c.}) / \Gamma_{\text{total}}$ Γ_{81} / Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.94±0.35±0.04	57	¹ ABLIKIM	15I	BES3 $\psi(2S) \rightarrow \gamma K^- \Lambda \bar{\Xi}^+ + \text{c.c.}$

¹ ABLIKIM 15I reports $[\Gamma(\chi_{c0}(1P) \rightarrow K^- \Lambda \bar{\Xi}^+ + \text{c.c.}) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ = $(1.90 \pm 0.30 \pm 0.16) \times 10^{-5}$ which we divide by our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^0 \bar{\Xi}^0) / \Gamma_{\text{total}}$ Γ_{82} / Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.1±0.8±0.1	23.3 ± 4.9	¹ NAIK	08	CLEO $\psi(2S) \rightarrow \gamma \Xi^0 \bar{\Xi}^0$

¹ NAIK 08 reports $(3.34 \pm 0.70 \pm 0.48) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^0 \bar{\Xi}^0) / \Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^- \Xi^+)/\Gamma_{\text{total}}$ Γ_{83}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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$4.8 \pm 0.7 \pm 0.1$	95 ± 11		¹ NAIK	08	CLEO $\psi(2S) \rightarrow \gamma \Xi^+ \Xi^-$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<10.3	90		² ABLIKIM	06D	BES2 $\psi(2S) \rightarrow \chi_{c0} \gamma$
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¹ NAIK 08 reports $(5.14 \pm 0.60 \pm 0.47) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \Xi^- \Xi^+)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

² Using $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.2 \pm 0.5)\%$

$\Gamma(\eta_c \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{84}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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< 7×10^{-4}	90	^{1,2} ABLIKIM	13B	BES3 $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

< 41×10^{-4}	90	^{1,3} ABLIKIM	13B	BES3 $e^+ e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$
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¹ Using 1.06×10^8 $\psi(2S)$ mesons and $B(\psi(2S) \rightarrow \chi_{c0} \gamma) = (9.68 \pm 0.31)\%$.

² From the $\eta_c \rightarrow K_S^0 K^\pm \pi^\mp$ decays.

³ From the $\eta_c \rightarrow K^+ K^- \pi^0$ decays.

$\Gamma(\rho \bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi \pi)/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{32}/\Gamma$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
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18.8 ± 1.0 OUR FIT

$15.3 \pm 2.4 \pm 0.8$	¹ ANDREOTTI	03	E835 $\bar{p} p \rightarrow \chi_{c0} \rightarrow \pi^0 \pi^0$
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¹ We have multiplied $B(\rho \bar{\rho}) \cdot B(\pi^0 \pi^0)$ measurement by 3 to obtain $B(\rho \bar{\rho}) \cdot B(\pi \pi)$.

$\Gamma(\rho \bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0 \eta)/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{33}/\Gamma$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
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<0.4	ANDREOTTI	05C	E835 $\bar{p} p \rightarrow \pi^0 \eta$
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$\Gamma(\rho \bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\pi^0 \eta')/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{34}/\Gamma$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
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<2.5	ANDREOTTI	05C	E835 $\bar{p} p \rightarrow \pi^0 \eta$
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$\Gamma(\rho \bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta \eta)/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{36}/\Gamma$

VALUE (units 10^{-7})	DOCUMENT ID	TECN	COMMENT
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6.7 ± 0.5 OUR FIT

$4.0 \pm 1.2^{+0.5}_{-0.3}$	ANDREOTTI	05C	E835 $\bar{p} p \rightarrow \eta \eta$
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$\Gamma(\rho \bar{\rho})/\Gamma_{\text{total}} \times \Gamma(\eta \eta')/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{37}/\Gamma$

VALUE (units 10^{-6})	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.1^{+2.3}_{-1.5}$	ANDREOTTI	05C	E835 $\bar{p} p \rightarrow \pi^0 \eta$
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RADIATIVE DECAYS

$\Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ Γ_{85}/Γ

<u>VALUE (units 10^{-2})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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1.40 ± 0.05 OUR FIT

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.25 ± 0.16 ± 2.15	12k	¹ ABLIKIM	17U BES3	$e^+e^- \rightarrow \gamma X$
2.0 ± 0.2 ± 0.2		² ADAM	05A CLEO	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Not independent from $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))$ and the product $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) \times B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))$ also measured in ABLIKIM 17U.

² Uses $B(\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow \gamma \gamma J/\psi)$ from ADAM 05A and $B(\psi(2S) \rightarrow \gamma \chi_{c0})$ from ATHAR 04.

$\Gamma(\gamma \rho^0)/\Gamma_{\text{total}}$ Γ_{86}/Γ

<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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< 9 90 1.2 ± 4.5 ¹ BENNETT 08A CLEO $\psi(2S) \rightarrow \gamma \gamma \rho^0$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 10 90 6 ± 12 ² ABLIKIM 11E BES3 $\psi(2S) \rightarrow \gamma \gamma \rho^0$

¹ BENNETT 08A reports $< 9.6 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

² ABLIKIM 11E reports $< 10.5 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \rho^0)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\gamma \omega)/\Gamma_{\text{total}}$ Γ_{87}/Γ

<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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< 8 90 0.0 ± 2.8 ¹ BENNETT 08A CLEO $\psi(2S) \rightarrow \gamma \gamma \omega$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 13 90 5 ± 11 ² ABLIKIM 11E BES3 $\psi(2S) \rightarrow \gamma \gamma \omega$

¹ BENNETT 08A reports $< 8.8 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

² ABLIKIM 11E reports $< 12.9 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \omega)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\gamma \phi)/\Gamma_{\text{total}}$ Γ_{88}/Γ

<u>VALUE (units 10^{-6})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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< 6 90 0.1 ± 1.6 ¹ BENNETT 08A CLEO $\psi(2S) \rightarrow \gamma \gamma \phi$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 16 90 15 ± 7 ² ABLIKIM 11E BES3 $\psi(2S) \rightarrow \gamma \gamma \phi$

¹ BENNETT 08A reports $< 6.4 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

² ABLIKIM 11E reports $< 16.2 \times 10^{-6}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma \phi)/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = 9.79 \times 10^{-2}$.

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_{89}/Γ
VALUE (units 10^{-4}) CL% DOCUMENT ID TECN COMMENT

2.04 ± 0.09 OUR FIT

• • • We do not use the following data for averages, fits, limits, etc. • • •

<7 90 ¹ WICHT 08 BELL $B^\pm \rightarrow K^\pm \gamma \gamma$

¹ WICHT 08 reports $[\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}}] \times [B(B^+ \rightarrow \chi_{c0} K^+)] < 0.11 \times 10^{-6}$
 which we divide by our best value $B(B^+ \rightarrow \chi_{c0} K^+) = 1.49 \times 10^{-4}$.

$\Gamma(e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}$ Γ_{90}/Γ
VALUE (units 10^{-4}) EVTS DOCUMENT ID TECN COMMENT

1.54 ± 0.33 ± 0.03 56 ¹ ABLIKIM 17i BES3 $\psi(2S) \rightarrow \gamma e^+ e^- J/\psi$

¹ ABLIKIM 17i reports $(1.51 \pm 0.30 \pm 0.13) \times 10^{-4}$ from a measurement of $[\Gamma(\chi_{c0}(1P) \rightarrow e^+ e^- J/\psi(1S))/\Gamma_{\text{total}}] \times [B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))]$ assuming $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.99 \pm 0.27) \times 10^{-2}$, which we rescale to our best value $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.79 \pm 0.20) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(e^+ e^- J/\psi(1S))/\Gamma(\gamma J/\psi(1S))$ Γ_{90}/Γ_{85}
VALUE (units 10^{-3}) EVTS DOCUMENT ID TECN COMMENT

9.5 ± 1.9 ± 0.7 56 ¹ ABLIKIM 17i BES3 $\psi(2S) \rightarrow e^+ e^- \gamma J/\psi$

¹ Uses $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) \times B(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S)) = (15.8 \pm 0.3 \pm 0.6) \times 10^{-4}$ from ABLIKIM 17N and accounts for common systematic errors.

$\Gamma(\gamma\gamma)/\Gamma(\gamma J/\psi(1S))$ Γ_{89}/Γ_{85}
VALUE (units 10^{-2}) DOCUMENT ID TECN COMMENT

1.45 ± 0.08 OUR FIT

2.0 ± 0.4 OUR AVERAGE

2.2 ± 0.4 ^{+0.1}/_{-0.2} ¹ ANDREOTTI 04 E835 $p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$

1.45 ± 0.74 ² AMBROGIANI 00B E835 $\bar{p}p \rightarrow \chi_{c2} \rightarrow \gamma\gamma, \gamma J/\psi$

¹ The values of $B(p\bar{p})B(\gamma\gamma)$ and $B(\gamma\gamma)B(\gamma J/\psi)$ measured by ANDREOTTI 04 are not independent. The latter is used in the fit because of smaller systematics.

² Calculated by us using $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.0593 \pm 0.0010$.

$\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}}$ $\Gamma_{56}/\Gamma \times \Gamma_{85}/\Gamma$
VALUE (units 10^{-7}) EVTS DOCUMENT ID TECN COMMENT

31.1 ± 1.5 OUR FIT

28.2 ± 2.1 OUR AVERAGE

28.0 ± 1.9 ± 1.3 392 ^{1,2,3} BAGNASCO 02 E835 $\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi \gamma$

29.3 ^{+5.7}/_{-4.7} ± 1.5 89 ^{1,2} AMBROGIANI 99B $\bar{p}p \rightarrow \chi_{c0} \rightarrow J/\psi \gamma$

¹ Values in $(\Gamma(p\bar{p}) \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$ and $(\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma J/\psi(1S))/\Gamma_{\text{total}})$ are not independent. The latter is used in the fit since it is less correlated to the total width.

² Calculated by us using $B(J/\psi(1S) \rightarrow e^+ e^-) = 0.0593 \pm 0.0010$.

³ Recalculated by ANDREOTTI 05A.

$$\frac{\Gamma(p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}}{\text{VALUE (units } 10^{-8}\text{)}} \quad \frac{\Gamma_{56}/\Gamma \times \Gamma_{89}/\Gamma}{\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}}$$

4.52 ± 0.27 OUR FIT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$$6.52 \pm 1.18^{+0.48}_{-0.72} \quad {}^1 \text{ ANDREOTTI 04 E835 } p\bar{p} \rightarrow \chi_{c0} \rightarrow \gamma\gamma$$

¹ The values of $B(p\bar{p})B(\gamma\gamma)$ and $B(\gamma\gamma)B(\gamma J/\psi)$ measured by ANDREOTTI 04 are not independent. The latter is used in the fit because of smaller systematics.

$\chi_{c0}(1P)$ CROSS-PARTICLE BRANCHING RATIOS

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\text{VALUE (units } 10^{-6}\text{)}} \quad \frac{\Gamma_{56}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}}{\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}}$$

21.7 ± 0.9 OUR FIT

23.7 ± 1.0 OUR AVERAGE

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
$23.7 \pm 0.8 \pm 0.9$	1222	ABLIKIM	13V BES3	$\psi(2S) \rightarrow \gamma p\bar{p}$
$23.7 \pm 1.4 \pm 1.4$	383 ± 22	¹ NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma p\bar{p}$
$23.6^{+3.7}_{-3.4} \pm 3.4$	89.5^{+14}_{-13}	BAI	04F BES	$\psi(2S) \rightarrow \gamma\chi_{c0}(1P) \rightarrow \gamma\bar{p}p$

¹ Calculated by us. NAIK 08 reports $B(\chi_{c0} \rightarrow p\bar{p}) = (25.7 \pm 1.5 \pm 1.5 \pm 1.3) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow p\bar{p})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\text{VALUE (units } 10^{-5}\text{)}} \quad \frac{\Gamma_{56}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}}$$

6.25 ± 0.26 OUR FIT

4.6 ± 1.9

$${}^1 \text{ BAI 98I BES } \psi(2S) \rightarrow \gamma\chi_{c0} \rightarrow \gamma\bar{p}p$$

¹ Calculated by us. The value for $B(\chi_{c0} \rightarrow p\bar{p})$ reported in BAI 98I is derived using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\text{VALUE (units } 10^{-6}\text{)}} \quad \frac{\Gamma_{69}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}}{\text{DOCUMENT ID} \quad \text{TECN} \quad \text{COMMENT}}$$

32.0 ± 2.3 OUR FIT

31.7 ± 2.3 OUR AVERAGE

VALUE (units 10^{-6})	EVTS	DOCUMENT ID	TECN	COMMENT
$32.0 \pm 1.9 \pm 2.2$	369	¹ ABLIKIM	13H BES3	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$
$31.2 \pm 3.3 \pm 2.0$	131 ± 12	² NAIK	08 CLEO	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

¹ Calculated by us. ABLIKIM 13H reports $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) = (33.3 \pm 2.0 \pm 2.6) \times 10^{-5}$ from a measurement of $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) \times B(\psi(2S) \rightarrow \gamma\chi_{c0})$ assuming $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.62 \pm 0.31)\%$.

² Calculated by us. NAIK 08 reports $B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) = (33.8 \pm 3.6 \pm 2.2 \pm 1.7) \times 10^{-5}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \Lambda\bar{\Lambda})/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-)}{\Gamma_{69}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
9.2±0.7 OUR FIT				
13.0^{+3.6}_{-3.5}±2.5	15.2 ^{+4.2} _{-4.0}	¹ BAI	03E BES	$\psi(2S) \rightarrow \gamma\Lambda\bar{\Lambda}$

¹ BAI 03E reports [$B(\chi_{c0} \rightarrow \Lambda\bar{\Lambda}) B(\psi(2S) \rightarrow \gamma\chi_{c0}) / B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-)] \times [B^2(\Lambda \rightarrow \pi^-p) / B(J/\psi \rightarrow p\bar{p})] = (2.45_{-0.65}^{+0.68} \pm 0.46)\%$. We calculate from this measurement the presented value using $B(\Lambda \rightarrow \pi^-p) = (63.9 \pm 0.5)\%$ and $B(J/\psi \rightarrow p\bar{p}) = (2.17 \pm 0.07) \times 10^{-3}$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{85}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)}}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
0.138±0.005 OUR FIT				

0.147±0.029 OUR AVERAGE		Error includes scale factor of 4.6.		
0.158±0.003±0.006	4.8k	¹ ABLIKIM	17N BES3	$\psi(2S) \rightarrow \gamma\gamma J/\psi$
0.024±0.015±0.205	12k	ABLIKIM	17U BES3	$e^+e^- \rightarrow \gamma X$
0.069±0.018		² OREGLIA	82 CBAL	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.4 ±0.3		³ BRANDELIK	79B DASP	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.16 ±0.11		³ BARTEL	78B CNTR	$\psi(2S) \rightarrow \gamma\chi_{c0}$
3.3 ±1.7		⁴ BIDDICK	77 CNTR	$e^+e^- \rightarrow \gamma X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.151±0.003±0.010	4.3k	⁵ ABLIKIM	12O BES3	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.125±0.007±0.013	560	⁶ MENDEZ	08 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.18 ±0.01 ±0.02	172	⁷ ADAM	05A CLEO	Repl. by MENDEZ 08

¹ Uses $B(J/\psi \rightarrow e^+e^-) = (5.971 \pm 0.032)\%$ and $B(J/\psi \rightarrow \mu^+\mu^-) = (5.961 \pm 0.033)\%$.

² Recalculated by us using $B(J/\psi(1S) \rightarrow \ell^+\ell^-) = 0.1181 \pm 0.0020$.

³ Recalculated by us using $B(J/\psi(1S) \rightarrow \mu^+\mu^-) = 0.0588 \pm 0.0010$.

⁴ Assumes isotropic gamma distribution.

⁵ Superseded by ABLIKIM 17N.

⁶ Not independent from other measurements of MENDEZ 08.

⁷ Not independent from other values reported by ADAM 05A.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\text{anything})}{\Gamma_{85}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)}}$$

$$\Gamma_{85}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{9}^{\psi(2S)} = \Gamma_{85}/\Gamma \times \Gamma_{147}^{\psi(2S)}/(\Gamma_{11}^{\psi(2S)} + \Gamma_{12}^{\psi(2S)} + \Gamma_{13}^{\psi(2S)} + 0.343\Gamma_{148}^{\psi(2S)} + 0.190\Gamma_{149}^{\psi(2S)})$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
0.224±0.009 OUR FIT				

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.201±0.011±0.021	560	¹ MENDEZ	08 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
0.31 ±0.02 ±0.03	172	ADAM	05A CLEO	Repl. by MENDEZ 08

¹ Not independent from other measurements of MENDEZ 08.

$$\Gamma(\chi_{c0}(1P) \rightarrow \gamma J/\psi(1S))/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \frac{\Gamma_{85}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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0.397±0.015 OUR FIT

0.358±0.020±0.037 560 MENDEZ 08 CLEO $\psi(2S) \rightarrow \gamma \chi_{c0}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.55 ±0.04 ±0.06 172 ¹ ADAM 05A CLEO Repl. by MENDEZ 08

¹ Not independent from other values reported by ADAM 05A.

$$\Gamma(\chi_{c0}(1P) \rightarrow \gamma\gamma)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}} \frac{\Gamma_{89}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
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2.00±0.08 OUR FIT

1.95±0.09 OUR AVERAGE

1.93±0.08±0.05 3.5k ABLIKIM 17AE BES3 $\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow 3\gamma$

2.17±0.32±0.10 0.2k ECKLUND 08A CLEO $\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow 3\gamma$

3.7 ±1.8 ±1.0 LEE 85 CBAL $\psi(2S) \rightarrow \gamma \chi_{c0}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.17±0.17±0.12 0.8k ¹ ABLIKIM 12A BES3 $\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow 3\gamma$

¹ Superseded by ABLIKIM 17AE.

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}} \frac{\Gamma_{32}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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8.34±0.29 OUR FIT

8.80±0.34 OUR AVERAGE

9.11±0.08±0.65 17k ¹ ABLIKIM 10A BES3 $e^+e^- \rightarrow \psi(2S) \rightarrow \gamma \chi_{c0}$

8.81±0.11±0.43 8.9k ² ASNER 09 CLEO $\psi(2S) \rightarrow \gamma \pi^+\pi^-$

8.13±0.19±0.89 2.8k ³ ASNER 09 CLEO $\psi(2S) \rightarrow \gamma \pi^0\pi^0$

¹ Calculated by us. ABLIKIM 10A reports $B(\chi_{c0} \rightarrow \pi^0\pi^0) = (3.23 \pm 0.03 \pm 0.23 \pm 0.14) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.4 \pm 0.4)\%$. We have multiplied the $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

² Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow \pi^+\pi^-) = (6.37 \pm 0.08 \pm 0.31 \pm 0.32) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$. We have multiplied the $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

³ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow \pi^0\pi^0) = (2.94 \pm 0.07 \pm 0.32 \pm 0.15) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$. We have multiplied the $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi\pi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \frac{\Gamma_{32}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}{\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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24.0±0.8 OUR FIT

20.7±1.7 OUR AVERAGE

23.9±2.7±4.1 97 ± 11 ¹ BAI 03C BES $\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow \gamma \pi^0\pi^0$

20.2±1.1±1.5 720 ± 32 ² BAI 98I BES $\psi(2S) \rightarrow \gamma \chi_{c0} \rightarrow \gamma \pi^+\pi^-$

¹We have multiplied $\pi^0\pi^0$ measurement by 3 to obtain $\pi\pi$.

²Calculated by us. The value for $B(\chi_{c0} \rightarrow \pi^+\pi^-)$ reported in BAI 98I is derived using $B(\psi' \rightarrow \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi' \rightarrow J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D]. We have multiplied $\pi^+\pi^-$ measurement by 3/2 to obtain $\pi\pi$.

$$\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{36}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.95±0.18 OUR FIT				
3.12±0.19 OUR AVERAGE				
3.23±0.09±0.23	2132	¹ ABLIKIM	10A BES3	$e^+e^- \rightarrow \psi(2S) \rightarrow \gamma\chi_{c0}$
2.93±0.12±0.29	0.9k	² ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma\eta\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.86±0.46±0.37	48	³ ADAMS	07 CLEO	$\psi(2S) \rightarrow \gamma\chi_{c0}$
¹ Calculated by us. ABLIKIM 10A reports $B(\chi_{c0} \rightarrow \eta\eta) = (3.44 \pm 0.10 \pm 0.24 \pm 0.13) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.4 \pm 0.4)\%$.				
² Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow \eta\eta) = (3.18 \pm 0.13 \pm 0.31 \pm 0.16) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.				
³ Superseded by ASNER 09. Calculated by us. The value of $B(\chi_{c0}(1P) \rightarrow \eta\eta)$ reported by ADAMS 07 was derived using $B(\psi(2S) \rightarrow \gamma\chi_{c0}(1P)) = (9.22 \pm 0.11 \pm 0.46)\%$ (ATHAR 04).				

$$\Gamma(\chi_{c0}(1P) \rightarrow \eta\eta)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{36}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
0.85 ±0.05 OUR FIT			
0.578±0.241±0.158	BAI	03C BES	$\psi(2S) \rightarrow \gamma\eta\eta$

$$\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma_{\text{total}} \quad \Gamma_{42}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
5.92±0.28 OUR FIT				
5.97±0.07±0.32	8.1k	¹ ASNER	09 CLEO	$\psi(2S) \rightarrow \gamma K^+K^-$

¹ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow K^+K^-) = (6.47 \pm 0.08 \pm 0.35 \pm 0.32) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\Gamma(\chi_{c0}(1P) \rightarrow K^+K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma\chi_{c0}(1P))/\Gamma(\psi(2S) \rightarrow J/\psi(1S)\pi^+\pi^-) \quad \Gamma_{42}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.71±0.08 OUR FIT				
1.63±0.10±0.15	774 ± 38	¹ BAI	98I BES	$\psi(2S) \rightarrow \gamma K^+K^-$

¹ Calculated by us. The value for $B(\chi_{c0} \rightarrow K^+K^-)$ reported by BAI 98I is derived using $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi\pi^+\pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}} \times \Gamma_{43} / \Gamma \times \Gamma_{147}^{\psi(2S)} / \Gamma_{\psi(2S)}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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3.10 ± 0.16 OUR FIT

3.18 ± 0.17 OUR AVERAGE

3.22 ± 0.07 ± 0.17	2.1k	¹ ASNER	09	CLEO $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
3.02 ± 0.19 ± 0.33	322	ABLIKIM	050	BES2 $\psi(2S) \rightarrow \gamma K_S^0 K_S^0$

¹ Calculated by us. ASNER 09 reports $B(\chi_{c0} \rightarrow K_S^0 K_S^0) = (3.49 \pm 0.08 \pm 0.18 \pm 0.17) \times 10^{-3}$ using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.22 \pm 0.11 \pm 0.46)\%$.

$$\Gamma(\chi_{c0}(1P) \rightarrow K_S^0 K_S^0) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times \Gamma_{43} / \Gamma \times \Gamma_{147}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
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8.9 ± 0.5 OUR FIT

5.6 ± 0.8 ± 1.3

¹ BAI	99B	BES	$\psi(2S) \rightarrow \gamma K_S^0 K_S^0$
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¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow K_S^0 K_S^0)$ reported by BAI 99B was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\Gamma(\chi_{c0}(1P) \rightarrow 2(\pi^+ \pi^-)) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times \Gamma_1 / \Gamma \times \Gamma_{147}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
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6.6 ± 0.5 OUR FIT

6.9 ± 2.4 OUR AVERAGE Error includes scale factor of 3.8.

4.4 ± 0.1 ± 0.9	¹ BAI	99B	BES $\psi(2S) \rightarrow \gamma \chi_{c0}$
9.3 ± 0.9	² TANENBAUM	78	MRK1 $\psi(2S) \rightarrow \gamma \chi_{c0}$

¹ Calculated by us. The value for $B(\chi_{c0} \rightarrow 2\pi^+ 2\pi^-)$ reported in BAI 99B is derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

² The value $B(\psi(1S) \rightarrow \gamma \chi_{c0}) \times B(\chi_{c0} \rightarrow 2\pi^+ 2\pi^-)$ reported in TANENBAUM 78 is derived using $B(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = (4.6 \pm 0.7)\%$. Calculated by us using $B(J/\psi(1S) \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

$$\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma_{\text{total}} \times \Gamma_8 / \Gamma \times \Gamma_{147}^{\psi(2S)} / \Gamma_{\psi(2S)}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
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1.78 ± 0.14 OUR FIT

1.64 ± 0.05 ± 0.2

ABLIKIM	05Q	BES2	$\psi(2S) \rightarrow \gamma \chi_{c0}$
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$$\Gamma(\chi_{c0}(1P) \rightarrow \pi^+ \pi^- K^+ K^-) / \Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) / \Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times \Gamma_8 / \Gamma \times \Gamma_{147}^{\psi(2S)} / \Gamma_{11}^{\psi(2S)}$$

VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT
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5.1 ± 0.4 OUR FIT

5.8 ± 1.6 OUR AVERAGE Error includes scale factor of 2.3.

4.22 ± 0.20 ± 0.97	BAI	99B	BES $\psi(2S) \rightarrow \gamma \chi_{c0}$
7.4 ± 1.0	¹ TANENBAUM	78	MRK1 $\psi(2S) \rightarrow \gamma \chi_{c0}$

¹The reported value is derived using $B(\psi(2S) \rightarrow \pi^+ \pi^- J/\psi) \times B(J/\psi \rightarrow \ell^+ \ell^-) = (4.6 \pm 0.7)\%$. Calculated by us using $B(J/\psi \rightarrow \ell^+ \ell^-) = 0.1181 \pm 0.0020$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{50}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.76±0.28 OUR FIT				
3.20±0.11±0.41	278	¹ ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow 2K^+ 2K^-)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow K^+ K^- K^+ K^-)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times \Gamma_{50}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
8.0±0.8 OUR FIT			
6.1±0.8±0.9	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow 2K^+ 2K^-)$ reported by BAI 99B was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma_{55}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{\psi(2S)}}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
0.78±0.07 OUR FIT				
0.78±0.08 OUR AVERAGE				
0.77±0.03±0.08	612	¹ ABLIKIM	11K BES3	$\psi(2S) \rightarrow \gamma$ hadrons
0.86±0.19±0.12	26	² ABLIKIM	06T BES2	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow \phi\phi)$ reported by ABLIKIM 11K was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.62 \pm 0.31)\%$.

² Calculated by us. The value of $B(\chi_{c0} \rightarrow \phi\phi)$ reported by ABLIKIM 06T was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.2 \pm 0.4)\%$.

$$\frac{\Gamma(\chi_{c0}(1P) \rightarrow \phi\phi)/\Gamma_{\text{total}} \times \Gamma(\psi(2S) \rightarrow \gamma \chi_{c0}(1P))/\Gamma_{\text{total}}}{\Gamma(\psi(2S) \rightarrow J/\psi(1S) \pi^+ \pi^-) \times \Gamma_{55}/\Gamma \times \Gamma_{147}^{\psi(2S)}/\Gamma_{11}^{\psi(2S)}}$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
2.25±0.21 OUR FIT			
2.6 ± 1.0 ± 1.1	¹ BAI	99B BES	$\psi(2S) \rightarrow \gamma 2K^+ 2K^-$

¹ Calculated by us. The value of $B(\chi_{c0} \rightarrow \phi\phi)$ reported by BAI 99B was derived using $B(\psi(2S) \rightarrow \gamma \chi_{c0}(1P)) = (9.3 \pm 0.8)\%$ and $B(\psi(2S) \rightarrow J/\psi \pi^+ \pi^-) = (32.4 \pm 2.6)\%$ [BAI 98D].

$\chi_{c0}(1P)$ REFERENCES

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ABLIKIM	18V	PR D97 052011	M. Ablikim <i>et al.</i>	(BES III Collab.)
AAIJ	17BB	EPJ C77 609	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	17AE	PR D96 092007	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	17AI	PR D96 112006	M. Ablikim <i>et al.</i>	(BES III Collab.)
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ABLIKIM	17N	PR D95 072004	M. Ablikim <i>et al.</i>	(BES III Collab.)
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ABLIKIM	15N	PR D91 112018	M. Ablikim <i>et al.</i>	(BES III Collab.)
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ADAM	05A	PRL 94 232002	N.E. Adam <i>et al.</i>	(CLEO Collab.)
ANDREOTTI	05A	NP B717 34	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
ANDREOTTI	05C	PR D72 112002	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
NAKAZAWA	05	PL B615 39	H. Nakazawa <i>et al.</i>	(BELLE Collab.)
ABE	04G	PR D70 071102	K. Abe <i>et al.</i>	(BELLE Collab.)
ABLIKIM	04G	PR D70 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
ABLIKIM	04H	PR D70 092003	M. Ablikim <i>et al.</i>	(BES Collab.)
ANDREOTTI	04	PL B584 16	M. Andreotti <i>et al.</i>	(E835 Collab.)
ATHAR	04	PR D70 112002	S.B. Athar <i>et al.</i>	(CLEO Collab.)
BAI	04F	PR D69 092001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ANDREOTTI	03	PRL 91 091801	M. Andreotti <i>et al.</i>	(FNAL E835 Collab.)
AULCHENKO	03	PL B573 63	V.M. Aulchenko <i>et al.</i>	(KEDR Collab.)
BAI	03C	PR D67 032004	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	03E	PR D67 112001	J.Z. Bai <i>et al.</i>	(BES Collab.)
ABE,K	02	PRL 89 142001	K. Abe <i>et al.</i>	(BELLE Collab.)
BAGNASCO	02	PL B533 237	S. Bagnasco <i>et al.</i>	(FNAL E835 Collab.)
EISENSTEIN	01	PRL 87 061801	B.I. Eisenstein <i>et al.</i>	(CLEO Collab.)

AMBROGIANI	00B	PR D62 052002	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
AMBROGIANI	99B	PRL 83 2902	M. Ambrogiani <i>et al.</i>	(FNAL E835 Collab.)
BAI	99B	PR D60 072001	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98D	PR D58 092006	J.Z. Bai <i>et al.</i>	(BES Collab.)
BAI	98I	PRL 81 3091	J.Z. Bai <i>et al.</i>	(BES Collab.)
GAISER	86	PR D34 711	J. Gaiser <i>et al.</i>	(Crystal Ball Collab.)
LEE	85	SLAC 282	R.A. Lee	(SLAC)
OREGLIA	82	PR D25 2259	M.J. Oreglia <i>et al.</i>	(SLAC, CIT, HARV+)
BRANDELIK	79B	NP B160 426	R. Brandelik <i>et al.</i>	(DASP Collab.)
BARTEL	78B	PL 79B 492	W. Bartel <i>et al.</i>	(DESY, HEIDP)
TANENBAUM	78	PR D17 1731	W.M. Tanenbaum <i>et al.</i>	(SLAC, LBL)
Also		Private Comm.	G. Trilling	(LBL, UCB)
BIDDICK	77	PRL 38 1324	C.J. Biddick <i>et al.</i>	(UCSD, UMD, PAVI+)
